

below). Leuco dyes are a new technology that are in the same family as liquid crystals, but they are not applied in the same manner. Leuco dyes are commonly in the form of ink that can be applied by hand, or professionally by screen printing, flexo, offset, etc.

The following reference is from Chromatic Technologies, a manufacturer of leuco dyes. "How do thermochromic inks work? Thermochromic inks are based on thermochromic encapsulated leuco dyes, which are similar to wax particles that "melt" as they heat up, changing their optical properties such that they lose their color. When they cool again, they solidify, regaining their color."

Website for more information [www.interactivecolors.com/FAQ.htm](http://www.interactivecolors.com/FAQ.htm)

To paint, as defined by Webster's Dictionary, is to produce lines and colors on a surface by applying pigments. One skilled in the art of temperature sensitive pigment technology would be aware of leuco dye products, which enable one to 'paint' on the device.

Examiner's Paragraph #2. -Definition of 35 USC 112-

Examiner's Paragraph #4. -Definition of Obviousness 35 USC 103-

The federal circuit has consistently held obviousness as a question of law based on factual inquiries mandated by 35USC§103<sup>1</sup>. The factual inquiries include: scope and content of prior art, level of ordinary skill in the art, differences between claims and the prior art, and the secondary considerations such as commercial success<sup>2</sup>. When Brown's claims are read in light of the specification, one skilled in the art would understand the bounds of the claim (i.e. must reasonable be apprised of the scope of the invention) *Miles Labs. Inc. v. Shandon Inc.*, 997 F.2d 870, 875, 27 USPQ 2d 1123, 1126 (Fed Cir. 1993). Clearly the scopes of these two inventions, Brown's Liquid Level indicator and our Ullage indicator are extremely different as described below.

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<sup>1</sup> Aktibolaget Karlstads Mekaniska Werkstad v. I.T.C., 705 F.2d 1565, 1575 (1983); Stratoflex, Inc. v. Aeroquip Corp., supra note 9 at 713 F.2d 1535; In re De Plauwe, 736 F.2d 699, 703 (1984); Vandenberg v. Dairy Equipment Co., 740 F.2d 1560, 1565 (1984); Jervis B. Webb Co. v. Southern Systems, Inc., 742 F.2d 1388, 1393 (1984).

<sup>2</sup> Jervis B. Webb v. Southern Systems, Inc., Supra note 27 at 742 F.2d 1393-1397.

Examiner's Paragraph #5.

**Applicant's invention solves a different problem than the reference, and such different problem is recited in the claims.** See *In re Wright*, 6 USPQ 2d 1959 (1988). The

5 Examiner stated "Brown discloses a cholesteric liquid crystal fluid level indicator that determines the level of a cooled liquid...". The applicant's invention does not perform the same operation as Brown's Liquid Level device. The invention (as stated) is for use on a tank of compressed gas, not liquid, to forecast the internal pressure change that will occur as the tank changes temperature during pressurization as determined by the common gas law.

10 The Examiner stated "With respect to claim 8, though the Examiner admits that the device is used for a beer keg, it is still used on a storage tank and it does *measure gas pressure changes within the tank* (see column 12 lines 38 through 64 for the basic operation of the device where a color change in relation to gas and temperature is clearly disclosed)." **This**

15 **interpretation of Brown is incorrect.** The cited reference does not teach what the Examiner relies upon that it is supposedly teaching. Column 12 lines 38 through 64 state that Brown's device works on the principal that a keg of beer (or similar container holding fluid) will warm at different rates where the holding container is in contact with fluid versus gas. In the exact words of Brown column 12 line 63, "the invention shows different colors adjacent the beer than it does  
20 the gas." **The Examiner has inserted references that are not in Brown's claims or device description**, that Brown's device *measures gas pressure changes within the tank* is false, it simply measures where the gas stops and the fluid begins.

25 The Examiner's words in his second paragraph of 5 are traversed. His "could obviously be adapted to the exact purpose by one of ordinary skill in the art." is an abuse of the term "skilled in the art" in denying our claim. What "art" is he referring to? There is no gas law physics (art) involved in Brown's invention. If the Examiner's position here is to be held, then any new process which, once it is created and understandable, could not be patented. There is nothing in Brown's invention that teaches gas law physics or its creative adaptation to our  
30 concept. Brown does not teach pressure changes or pressure drop as determined by the common gas law in regards to adiabatic temperature change. **This is an unsuggested modification in**

which the prior art lacks any suggestion that the reference should be modified in a manner required to meet the claims. Totally new to Brown is our process of using the sensing of temperature to trigger, on the basis of the gas law, an indication of gas availability in the future. Brown deals only with the instant indication and what it means in that instant. Relating usefully to the future from a current indication is creative beyond any simple level indicator based on any method of sensing, including Brown's. We hope that the Examiner can see this in a different light than simply "obvious" for anyone who can understand our process.

In addition, the statutory basis of rejection due to obviousness is 35 USC §103. A key point to consider as stated by this statute is "that **the subject matter as a whole** would have been obvious at the time the invention was made." The court stated that it is proper to consider the conception of a new and useful improvement along with the actual means of achieving the improvement. See *In re Horton* 121 USPQ 218, 219 (CCPA 1959).

According to the court: "...though the structure may be but a simple expedient when the novel concept is realized, that structure may not be obvious to the skilled worker in the art where the prior art has failed to suggest the problem or conceive of the idea for its elimination."

**The following CAFC decisions state that these advantages as stated in prior art, must be a plain suggestion to invalidate a new invention's claim.**

*Fromson v. Advance Offset Plate* 755 F.2d 1549, 225 USPQ 26 (CAFC 1985). CAFC stated "where, as here, nothing of record plainly indicates that it would have been obvious to combine separate process steps into one process, it is legal error to conclude that a claim to that process is invalid under §103.

*King Instrument Corp. v. Otari Corp.* 767 F.2d 853 (CAFC 1985).

CAFC stated "nothing of record plainly indicated that it would have been obvious to combine prior art."

**Brown does not plainly state any advantages in his claim to modify or change his invention in a means that could be used to determine ullage, pressure drop, or adapting for pressurized containers.**

In addition, we believe that our device is not obvious referencing the case of *Graham v. John Deere*, 381 US1, 148 USPO 459 (1966) in which §5 states that secondary objective circumstances must be taken into account when deciding that an invention is not obvious.

The federal circuit has elevated the importance of secondary considerations in the determination of obviousness (57) the federal circuit has ruled that even in a situation in which the prior art suggested the claimed invention to one of ordinary skill in the art and there was a prima facie showing of obviousness, *evidence of commercial success will require a finding of non-obviousness*. See *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575-1576 (Fed Cir. 1984); *In re Piasecki*, 745 F.2d 1468 (Fed Cir. 1984).

a) Commercial Success –since the official public release of the product in late summer 2002 and through mid-November 2002, from the commercial side we have secured 2 international distributors (National Divers Mfg., and Trident Dive Equipment- the latter being the largest distributor of dive accessories in the world).

Trident’s initial order was over 1200 units each of the device.

Combined, these distributors sell our device to every state in the U.S. and have the means to distribute to over two dozen foreign countries.

b) Long felt but unsolved need – this was stated in the initial rebuttal. To prove this point, we have received numerous letters from divers across the country stating that this was a great idea that will improve their scuba diving. Many of these letters were submitted with response to the prior office action.

A sub-category of “long felt but unsolved need” which deserves consideration, is that of *Professional Recognition*. In addition to the public stating a Long felt but unsolved need, the invention has been recognized in a professional publication as one that helps solve a problem that has existed for divers and has was not addressed until this invention. See previously included *California Diving News*.

c) Failure of others to invent/Lack of implementation --- Clearly, as stated under the category “Long felt but unsolved need” and receiving Professional Recognition as such, there is a definitely a need for this invention and it had yet to be solved. This poses the question, “If it is so obvious, why hasn’t anyone in this field invented such a device before? If it is so obvious why hasn’t anyone adapted Brown’s device for this use?” The answer is that this device is not obvious to one skilled in the art, nor is it obvious or stated

as advantageous to alter or adjust Brown's invention to be usable in such a way to show pressure drop, ullage, or the like.

**Brown's device could not be adapted to meet our claims** because as stated in Brown's title, *Liquid Crystal Liquid Level Indicator*, the common gas law (operative word being gas) means that the calculations used to determine pressure change can only be performed so long as the contents of the container stay in the gaseous state. Fluids by their very nature can not be compressed because they are already in their most dense form. In addition, Brown's device must be placed on the container vertically. This is because liquid is heavier than gas and in order to have the device to work, it must cross the threshold of where the fluid stops and the gas begins. With our device it makes no difference where on the tank it is placed because the tank is only filled with gas so the entire tank has the same heat diffusal rate. Because of these reasons, Brown's Fluid Level Indicator can not be altered to meet our claims.

We traverse the Examiner's opinion when stating "With respect to claim 9, figure 3 and column 11 line 44 through column 12 line 64 disclose coatings formed in distinct areas, each area sensitive to a particular color-changing temperature. Figure 5 shows, and column 10 lines 36 through 49 describe that the strip could comprise indicia, which could be of any type, including numbers, which would be useful for displaying information of the tank contents." Stating that "Indicia" could represent the pressure drop calculations is incorrect and the Examiner has inserted a reference that is not made by Brown. Brown states in column 10 line 44 through 46, "The indicia could display a logo, company name, instructions, or other useful information. The idicia is an alternative element of the instant invention." In this statement, **Brown implies that the indicia is one-dimentional information, not implying that the information is a function or effect of the temperature being sensed.** In order to infer that "Other useful information" would include pressure drop (or similar) for an ending temperature of a container of compressed gas, Brown would have to reference to this in his specifications. Again, Brown does not teach pressure changes or pressure drops as determined by the common gas law in regards to temperature change.

With respect to the Examiner's objection to Claim 3, our claim is a dependent claim applying to a new concept as described in Claim 8. Is the Examiner determining that no patent for anything can involve film technology without being pre-empted by Brown? We traverse the Examiner's simple statement regarding Claim 3.

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“With respect to claim 4, the areas are shown in figure 3 and column 11 line 44 through column 12 line 64 to be organized in groups, each group corresponding to a final temperature of the tank.” In the referenced section, Brown discloses temperature ranges that would best suit the varying ideal temperature for different types of beer. He identifies three ranges that would best  
10 suit beer storage as stated in column 12 lines 19 through 21 “Three formulations have been found to accommodate the three basic temperature ranges for ideal beer and determining beer level”. Combining the three temperature ranges would give a temperature range from approximately 34°F to 60°F. We traverse the Examiner's opinion that just because there are multiple segments described in both inventions that they perform the same task. The Examiner misunderstood the  
15 reference by stating that on Brown's device “Each group corresponds to a final temperature.” **This is incorrect, as Brown's device does not indicate pre-determined final temperatures and the result of the temperature changes on the contents of the container. Brown's device shows fluid levels within the container and the best holding/storage temperature for the contents of that container.** Again the Examiner has added a reference to Brown's device that  
20 is not stated in the specifications or the claims. The Examiner stated “...each group corresponding to a final temperature.” Brown does not specify a “Final” or ending temperature, merely holding temperatures and very slight fluctuations in temperature as a refrigerator door is opened or the cooling compressor temporarily stops.

25 “With respect to claim 5, the indications represent the amount of liquid and gas available compared to a filled tank at the same pressure.” The Examiner's position on this statement is completely incorrect and we traverse the Examiner's opinion for the following 3 reasons: 1) The two devices are completely different in that Brown's device shows the level where the fluid ends and the gas begins. Our device relies on the common gas laws to determine pressure changes as  
30 the temperature changes within the tank, **our device does not indicate a level and Brown's device does not forecast pressure change.** 2) Brown's device will indicate where the fluid ends

and the gas begins, so a person can look at the tank and estimate how much of the tank is gas. Brown does not take into account the pressure within the tank and how temperature will effect this pressure. 3) Because liquids do not compress, two containers at varying temperatures will still have the same amount of liquid.

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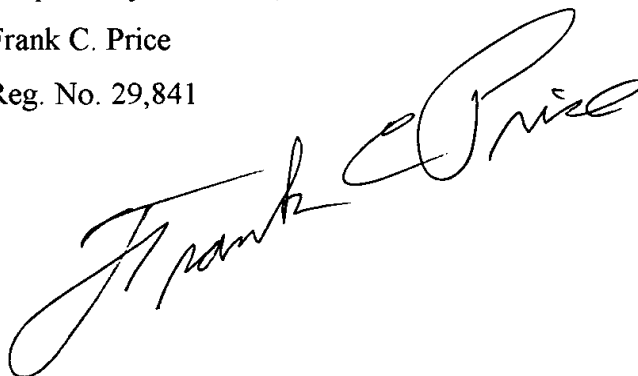
“With respect to claim 6, the numbers can represent any useful information, such as pressure, as disclosed in column 10 lines 36 through 49.” We traverse this statement because the Examiner has inserted a reference that is not made by Brown. Brown does not disclose any information regarding pressure or pressure changes. Brown states in column 10 line 44 through 10 46, “The indicia could display a logo, company name, instructions, or other useful information. The idicia is an alternative element of the instant invention.” In this statement, **Brown implies that the indicia is one-dimensional information, not implying that the information is a function or effect of the temperature being sensed.** In order to infer that “Other useful information” would include pressure drop (or similar) for an ending temperature of a container of 15 compressed gas, Brown would have to reference to this in his specifications. Brown does not teach pressure changes or pressure drops as determined by the common gas law in regards to temperature change.

By thoroughly addressing every point of the Examiner’s position we hope we have 20 presented a solid case for our application.

Respectfully submitted,

Frank C. Price

Reg. No. 29,841

A handwritten signature in cursive script, reading "Frank C. Price". The signature is written in dark ink and is positioned below the typed name and registration number.